



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,396	09/23/2003	Takeshi Yoneda	032405R156	9368
441	7590	06/27/2005	EXAMINER	
SMITH, GAMBRELL & RUSSELL, LLP 1850 M STREET, N.W., SUITE 800 WASHINGTON, DC 20036			MANCHO, RONNIE M	
		ART UNIT		PAPER NUMBER
				3663

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/667,396	YONEDA, TAKESHI
	Examiner	Art Unit
	Ronnie Mancho	3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 23 September 2003.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-24 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/23/03; 12/19/03</u> | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because in line 18, the applicant is advised to change “suppress” to --suppressing-- for clarity. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, lines 16 and 17, “said final clutch torque” lacks antecedent basis.

In claim 13, line 3, said “the other” lacks antecedent basis. It is suggested that “another” should be used instead. In lines 12 and 13, “said ratio” lacks antecedent basis.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Rodrigues et al (6047231).

Art Unit: 3663

Regarding claim 1, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40) disclose a differential limiting control apparatus for a vehicle having a clutch unit 135 interposed between one rotational shaft 132 and another rotational shaft 133 (fig. 1) for variably changing a driving force transmission between the one rotational shaft and the other rotational shaft, comprising:

a feedback control clutch torque computing unit 100 for computing the clutch torque of the clutch unit 135 based on vehicle behaviors (col. 3, lines 1-40; col. 6, lines 39-63) through feedback control,

a feed forward unit 100 for computing the clutch torque based on said behaviors through a feed forward control,

a tire diameter difference computing unit for computing diameter difference of a tire (col. 9, lines 1-21), and

a clutch torque computing unit for computing a final clutch torque by changing a ratio of said torque obtained through the feedback control and the feed forward control according the diameter difference of the tire (col. 6, lines 42-63; col. 9, lines 1-21).

Regarding claim 2, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus of claim 1, wherein:

the feedback control clutch torque computing unit has a target differential speed setting unit for setting a target differential speed between the one rotational shaft and the other rotational shaft;

an actual differential speed detecting unit for detecting an actual differential speed between the one rotational shaft and the other rotational shaft; and

Art Unit: 3663

a clutch torque computing unit for computing an engagement force of the clutch unit by obtaining a deviation between the target differential speed and the actual differential speed with a switching function by using at least a polarity related to an integral term of the deviation and by applying a sliding mode control.

Regarding claim 3, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth in claim 1, wherein:

the clutch torque computing unit reduces the ratio of said clutch torque obtained through the feed forward control as the diameter difference of the tire increases.

Regarding claim 4, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth in claim 1, wherein:

the tire diameter difference computing unit calculates the diameter difference based on at least an actual differential speed between the one rotational shaft and the other rotational shaft when the vehicle is running substantially straight and when slippage is so difficult to be detected between a road and wheels.

Regarding claim 5, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth claim 1, wherein:

the clutch unit is interposed between a front axle and a rear axle.

Regarding claim 6, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth claim 2, wherein:

the clutch unit is interposed between a front axle and a rear axle.

Regarding claim 7, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth claim 3, wherein:

Art Unit: 3663

the clutch unit is interposed between a front axle and a rear axle.

Regarding claim 8, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth claim 4, wherein:

the clutch unit is interposed between a front axle and a rear axle.

Regarding claim 9, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth claim 1, wherein:

the clutch unit limits a differential action of a differential interposed between left and right wheel.

Regarding claim 10, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth Claim 2, wherein:

The clutch limits a differential action of a differential interposed between left and right wheel.

Regarding claim 11, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth Claim 3, wherein:

The clutch limits a differential action of a differential interposed between left and right wheel.

Regarding claim 12, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth Claim 4, wherein:

The clutch limits a differential action of a differential interposed between left and right wheel.

Regarding claim 13, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control method for a vehicle having a clutch unit

Art Unit: 3663

interposed between one rotational shaft and other rotational shaft for variably changing a transmitting route of a driving force between the one rotational shaft and the other rotational shaft, comprising the steps of:

computing the clutch torque of the clutch unit based on behaviors of a vehicle (col. 3, lines 1-40; col. 6, lines 39-63) through feedback control,

computing said clutch torque based on said behaviors through a feed forward control,

computing a diameter difference of tires (col. 9, lines 1-21), and

computing a final clutch torque by changing said ratio of the clutch torque obtained through the feedback control and said clutch torque obtained through the feed forward control according to the tire diameter difference of the tire (col. 6, lines 42-63; col. 9, lines 1-21)..

Regarding claim 14, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control apparatus as set forth Claim 13, wherein:

The feedback control clutch computing step has a target differential speed setting step for setting a target differential speed between the one rotational shaft and the other rotational shaft, an actual speed detecting step for detecting an actual differential speed between the one rotational shaft and the other rotational shaft, and

a clutch torque computing step for computing an engagement force of the clutch unit by obtaining a deviation between the target differential speed and the actual differential speed with a switching function by using at least a polarity related to an integral term of the deviation and by applying a sliding mode control.

Regarding claim 15, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control method as set forth in claim 13 wherein:

Art Unit: 3663

The clutch torque computing step reduces the ratio of said clutch torque obtained through the feed forward control as the diameter difference of the tire increases.

Regarding claim 16, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control method as set forth in claim 13 wherein:

the diameter difference computing step calculates the diameter difference based on least an actual differential speed between the one rotational shaft and the other rotational shaft when the vehicle is running substantially straight and when a slippage is difficult to be detected between the road and said wheel.

Regarding claim 17, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the differential limiting control method as set forth in claim 13, wherein:

the clutch unit is interposed between a front axle and rear axle.

Regarding claim 18, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the limiting control method as set forth in claim 14, wherein:

the clutch unit is interposed between a front axle and rear axle.

Regarding claim 19, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the limiting control method as set forth in claim 15, wherein:

the clutch unit is interposed between a front axle and rear axle.

Regarding claim 20, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the limiting control method as set forth in claim 16, wherein:

the clutch unit is interposed between a front axle and rear axle.

Regarding claim 21, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the limiting control method as set forth in claim 13, wherein:

Art Unit: 3663

the clutch unit limits the differential action of a differential interposed between a left and right wheel.

Regarding claim 22, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the limiting control method as set forth in claim 14, wherein:

the clutch unit limits the differential action of a differential interposed between a left and right wheel.

Regarding claim 23, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the limiting control method as set forth in claim 15, wherein:

the clutch unit limits the differential action of a differential interposed between a left and right wheel.

Regarding claim 24, Rodrigues (abstract, figs. 1-4; col. 2, lines 54 to col. 3, lines 1-40; col. 4-9) disclose the limiting control method as set forth in claim 16, wherein:

the clutch unit limits the differential action of a differential interposed between a left and right wheel..

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following: US005979584A, US006498974B1, US006502027B2, US006631779B2, US 4989686, all disclose a differential limiting control.

Art Unit: 3663

Communication

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronnie Mancho whose telephone number is 571-272-6984. The examiner can normally be reached on Mon-Thurs; 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ronnie Mancho
Examiner
Art Unit 3663

6/22/05

JACK KEITH
PRIMARY EXAMINER
SPE 3663